Ain Shams University
Faculty of Engineering
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IMPROVING PUNCHING SHEAR BEHAVIOR OF FLAT RC SLABS

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A Thesis

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Degree of Master of Science in Structural Engineering

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STATEMENT

This thesis is submitted to Ain shams University, Cairo, Egypt, for the degree of Master of Science in Civil Engineering (Structural).

The work included in this thesis was carried out by the author in the Department of Structural Engineering, Faculty of Engineering, Ain Shams University, from 2013 to 2015

No part of this thesis has been submitted for a degree or a qualification to any other University or Institution.

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Improving Punching Shear Behavior of Flat RC Slabs
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ABSTRACT

This work presents a method to improve the punching shear resistance of flat RC slabs that develop cracking at regions between the slab and column. The work examines the effect the punching shear capacity of using glass fiber at slab column interface to enhance. The study consists of an experimental phase and a theoretical study.

The experimental work divides the test specimens into two groups (A & B). The first group, Group (A) includes six specimens of reinforced concrete slabs having a concrete compressive strength (35 MPa). Three of these specimens rest on columns and the other three rest on column capitals.

The second group, Group (B) is similar; however, it has a concrete compressive strength of (17 MPa). Four specimens were loaded until failure and used as reference .Eight specimens were loaded up to 80% and 50% of the failure load. After being unloaded, these eight specimens were strengthened using glass fiber then loaded to failure.

The deflection, cracking, failure modes, strain in steel reinforcement and relationship between load deflection and load-strain were recorded and discussed. Results show that strengthening using GFRP enhanced the shear capacity of the tested specimens. Enhancement was significant for group (A) specimens.

The first group, Group (A) after strengthening by glass fiber it improved resistance about (13%-23%) in specimens rest on columns and it improved resistance about (11%-15%) in the specimens rest on column capitals.

The second group, Group (B) after strengthening by glass fiber decreased the failure about (4.5%-23%) in specimens rest on columns and it improved resistance about (0%-9%) in the specimens rest on column capitals.

In the analytical study, the specimens were modeled using a non liner computer program. Fair agreement was found between the experimental and the theoretical results.

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